



Researchers urge multi-level action to tackle climate-to-local pressures on forests

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Understanding how tropical forests and coral reefs respond to climate extremes — and how they interact with other stressors — is critical for achieving global conservation targets, according to researchers.

Better predictive models must be developed to learn more about the process through which climate change, extreme weather and pressures from local human activities lead to tropical biodiversity and ecosystem loss, the researchers said in a new paper published in [*Philosophical Transactions of the Royal Society Biological Sciences*](#) journal.

Managing tropical ecosystems locally may not be effective enough if global climate change threats are not addressed, and if countries do not act together to protect tropical forests and coral reefs for future generations, they said.

“We urge the creation of conservation initiatives to develop interventions that effectively curb local disturbances, but these will be of limited success if they are not accompanied by international actions to decrease CO₂ emissions and therefore slow global climate changes,” said the researchers, who focused their study on tropical forests and coral reefs because the two ecosystems contain much of the world’s biodiversity.

Although tropical forests cover less than 12 percent of the planet’s ice-free land mass, they host more than two thirds of all terrestrial species and play a key role in overall climate regulation by storing a quarter of the carbon in the terrestrial biosphere, they said. Coral reefs cover only 0.1 percent of the ocean surface, but they hold the highest species diversity of any marine ecosystem as well as providing other benefits, including coastal protection.

“Many local threats to tropical forests and coral reefs, such as deforestation, overfishing, and pollution, reduce the diversity and functioning of these ecosystems, said Filipe França from Brazil’s [Embrapa Amazônia Oriental](#) and Britain’s [Lancaster University](#).

“This in turn can make them less able to withstand or recover from extreme weather. Our research highlights the extent of the damage which is being done to ecosystems and wildlife in the tropics by these interacting threats.”

The researchers mapped more than 100 locations where the two ecosystems have been hit by hurricanes, floods, heatwaves, droughts and fires, demonstrating the threats they face from a combination of climate changes, increasingly extreme weather and damaging local human activities.

Tropical forests have been severely affected by heavy rainstorms and hurricanes in the Caribbean, Central and South America, exacerbated by changes in river flow caused by the

La Nina weather system, they said. This has led to reductions in non-tree resources, changes in plant-herbivore networks and greater than 50 percent declines in rates of occupancy, and bird extinctions, the scientists report.

Worsening heatwaves and drought are also taking their toll on forests, leading to unprecedented wildfires, the research showed. This has led to higher rates of tree mortality and had negative consequences on biological communities. Ultimately, ecosystem resilience and stability are harmed, negatively affecting forest carbon cycling, the paper said.

Santarém in the Brazilian state of Pará was one of the worst hit by an El Niño weather system in 2015, Franca said. “The region experienced a severe drought and extensive forest fires, and I was very sad to see the serious consequences for forest wildlife.”

The drought also affected the ability of the forest to recover from the fires, she said.

Dung beetles play a vital role in forest recovery by spreading seeds, but seed spreading activity plummeted in forests after the El Nino, the report showed.

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